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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/782,928

02/23/2004

Shin-ichi Uehara

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EXAMINER

CHANG, AUDREY Y

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/782,928

Applicant(s)

UEHARA ET AL.

Examiner

Audrey Y. Chang

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(M)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/23/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the symbols “X”, “Y” and “tan(1’)” recited in various claims must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “D” has been used to designate both *distance from the most distant point* to the display panel and *distance from midpoint* to the display panel, as recited in **claims 1 and 14** respectively. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as

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either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 4-5, 9-10, 17-18 and 22-23 are rejected under 35 U.S.C. 112, first paragraph, as** failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could the optical unit, either of a parallax barrier having a plurality of slits or of a lenticular lens having a plurality of cylindrical lenses, arranged for each row of the pixel sections and extended along an extending direction of the row is capable of providing three-dimensional image display. It is implicitly true that the either the slits or the cylindrical lens arranged along the extended direction of a row will have *vertical* lens function, (with respect to a viewer), that forms *horizontal* image line which then cannot be able to provide stereoscopic image view. Furthermore, the specification and the figures **only** give **support** for the slits or the cylindrical lenses to have *horizontal lens function*, which forms vertical image line at different **horizontal locations** to define the viewing region, (please see Figures 1-11). It is obvious that the **two eyes** are located on *horizontal line* not vertical line. No disclosure of the slits or lenticular lenses being arranged along the row of the pixels can be found in the specification and the Figures.

Claim Objections

5. Claims 1-24 are objected to because of the following informalities:

(1). The phrase “in a matrix state” recited in claims 1, 6, 14, and 19 is confusing and indefinite since it is not clear what is considered to be a matrix state. The phrase may be better described as “in matrix form”.

(2). The phrase “at least one array direction out the array directions of said pixels sections” recited in claims 1, 6, 14 and 19 and the phrase “another array direction” recited in various dependent claims are confusing and indefinite. It is not clear what is considered to be “array direction”. A matrix form in general is two dimensional in nature, in particular when referred to the arrangement of pixels, it includes *rows* and *columns* of the pixels. Perhaps it is better to describe the “array directions” as *column* direction and *row* direction.

(3). The symbol “ $\tan(1')$ ” recited in various claims is confusing and indefinite since the claims fail to give a definition and *physical meanings* for such symbol.

(4). The phrase “the distance between the most distant point ... by positioning a midpoint between a viewer’s right eye and left eye in the range, and said display panel” recited in claims 1 and 6 is *confusing* and *indefinite* since it is not clear the distance is between **what?** It is not clear how does this “most distant point” be defined and how does it relate to the “midpoint”. The distance is therefore not well defined.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 6, 8, 11-14, 16, 19, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Momochi (PN. 5,528,420).

Momochi teaches a *method* and *apparatus* for outputting image for stereoscopic vision wherein the apparatus comprises a display panel having a *plurality of pixels* forming pixel sections wherein the plurality of pixels displaying image for the right eye and image for the left eye respectively, and the pixels has a *matrix* form, (please see Figures 4 and 5). The apparatus further comprises an *optical unit*, such as a *lenticular lens*, for re-emitting image light from the display panel to *right eye and left eye of an observer*, respectively, (please see Figures 6-8). It is implicitly true that the optical unit will establish a three-dimensional visible *range*, which correspond to a three dimensional region that the left eye of the observer will *only* see the left eye image and the right eye of the observer will *only* see the right eye image. And it is implicitly true that there is a definite distance (D') between the most distant point in the range and the display panel and there is a definite distance (D'') between the midpoint of the two eyes and the display panel. As demonstrated by the Figure 7, the distance D'' , measured from the midpoint of the two eyes to the display panel, should equal to D (observation distance) *plus* ($n \cdot f$). The symbol " n " means refractive index of the lenticular lens and " f " means the focal length of the lens. The *smallest* separation between two adjacent image pixel sections that can be resolved by the eyes so that one image from the first pixel section to be directed to left eye and the other image from the adjacent second pixel section to the right eye is indicated in Figure 7 as Δ . And the definition of the pixel section is defined as $1/\Delta$. From simple geometry one can calculate the definition of the pixel section as the following:

Assuming the *angular separation* between the image lights from the two adjacent pixel sections is a and the angular separation of the image light after passing through the optical unit or lenticular lens is b . Then the following condition can be established:

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$\Delta/n*f = \tan(a)$ and $W/D = \tan(b)$. W being the separation distance between two eyes and D is the observation distance.

The actual distance between the midpoint of the two eyes and the display panel (D') and the actual distance between the most distant point in the three dimensional visible range and the display panel (D'') are defined as follows:

$$D' = D + n*f \text{ and } D'' > D'.$$

One can then get the following conditions:

$\Delta + W = (n*f) \tan(a) + D \tan(b)$, for paraxial light, $b = n*a$, and $\tan(a)$ approximately equals to a in radians and $\tan(b)$ approximately equals to b in radians. And if the optical unit is a *parallax barrier* with slits instead of the lenticular lens, the angle a will be equal to angle b . This means the following:

$\Delta + W$ approximately equals $(n*f + D) * \tan(a)$, which then equals to $D' * \tan(a)$. This means

$\Delta < D' * \tan(a)$, or $1/\Delta > 1/(D' * \tan(a))$, with the conversion factor between millimeter to inch (i.e. 25.4 millimeter per inch), $1/\Delta > 25.4/(D' * \tan(a))$ (dpi). Similarly $\Delta < D'' * \tan(a)$, (i.e. distance measured from display panel to the most distant point in the visible range).

This means $1/\Delta > 25.4/(D'' * \tan(a))$ (dpi). The definition of the pixel section ($1/\Delta$) therefore is defined with respect to the angular separation of the image light from the adjacent pixel section. This reference however does not teach the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This means the definition is $1/\Delta > 25.4/(D'' * \tan(1'))$ (dpi).

With regard to claims 6, and 19, Momochi teaches that for Δ assumes values of 0.05 mm, the definition is therefore about 500 dpi, (pleas see column 10). For observation distance greater than 250 mm from the display panel, the definition of the pixel section is 350 dpi. Although this reference does not teach explicitly that the observation distance is 500 mm, however this observation distance is standard

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distance in most of the display apparatus, such modification would have been obvious to allow comfortable viewing or observation distance for the observer.

With regard to claims 3, 8, 16 and 21, this reference does not teach explicitly that the display panel is a liquid crystal display device. However liquid crystal display device is commonly used in stereoscopic image display apparatus, such modification would have been obvious to one skilled in the art for the benefit of applying common type of display device to achieve the stereoscopic image display.

With regard to claims 11 and 24, Momochi teaches the image display device is intended for displaying three-dimensional images taken from photographs and being processed by a computer, (please see 3). However it does not specify that it is movie picture. But the application of such display apparatus to display movie pictures would have been obvious to one skilled in the art since it involves only feed in movie pictures to the computer for processing, and such modification has the advantage of displaying three dimensional movie pictures.

With regard to claims 12-13, this reference also does not teach explicitly that the display apparatus is applied to different portable devices. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Madham*, 2 USPQ2d 1647 (1987).

8. **Claims 2, 4, 7, 9, 15, 17, 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Momochi as applied to claims 1, 6, 14 and 19 above, and further in view of the patent issued to Isono et al (PN. 5,315,377).**

The method and apparatus for outputting image for stereoscopic vision taught by Momochi as described for claims 1, 6, 14 and 19 above has met all the limitations of the claims. With regard to claims 2, 7, 15 and 20, this reference does not teach explicitly about the definition of the pixel section in a

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second direction of the pixels matrix. With regard to claims 4, 9, 17 and 22, this reference also does not teach explicitly that the optical unit can be a parallax barriers with a plurality of slits. Isono et al in the same field of endeavor teach a three-dimensional image display wherein a *parallax barrier* having a plurality of slits (Figures 2, 4 and 8A), that is aligned with the matrix arrangement of the pixels (Figures 8B and 9) is used to provide the three-dimensional image display. It is implicitly true for square or rectangular type of pixel section, the same definition analysis disclosed above also applies for the second direction of the matrix to allow the image being resolved by the eyes of the observer to achieve stereoscopic viewing. It would then have been obvious to one skilled in the art to apply the teachings of Isono et al to modify the display apparatus of Momochi to use parallax barrier, an electronic one as disclosed by Isono et al, as alternative means to achieve the stereoscopic image display for the benefit of allowing different design and control, (the electronic driven parallax barrier has the advantage of controlling the slit size), that suited for different application to achieve the stereoscopic image viewing.

9. Claims 5, 10, 18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Momochi as applied to claims 1, 6, 14 and 19 above, and further in view of the patent issued to Chikazawa (PN. 5,852,512).

The method and apparatus for outputting image for stereoscopic vision taught by Momochi as described for claims 1, 6, 14 and 19 above has met all the limitations of the claims. Momochi teaches the optical unit is a *lenticular* lens having a plurality of cylindrical lenses. However it does not teach explicitly that the cylindrical lenses are along the *row* direction of the pixels. However the specification fails to provide the teachings and support for achieving such, it is therefore examined with the broadest interpretation.

Chikazawa in the same field of endeavor teaches a lenticular lens having a plurality of cylindrical lenses that are arranged along the row direction of the pixels. It would then have been obvious

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to one skilled in the art to modify the arrangement according to Chikazawa for the benefit of providing different arrangement of the pixels for achieving the same stereoscopic image display.

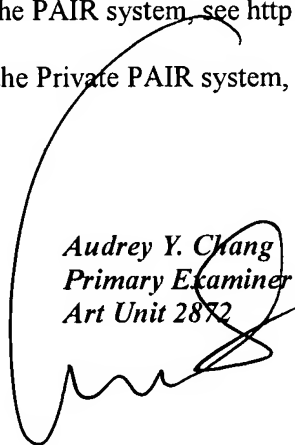
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Audrey Y. Chang
Primary Examiner
Art Unit 2872*



A. Chang, Ph.D.